

IN THE CLAIMS

1. (Currently Amended) A method, comprising:

calculating, by a device that shares one or more upstream channels with other devices, an available bandwidth of a first upstream channel based at least on upstream channel bandwidth data transmitted from a remote system, wherein the remote system comprises a cable modem termination system (CMTS);

determining by the device, whether based, at least in part on particular data, an upstream channel data transfer rate can be improved over a current data transfer rate of the first upstream channel from the device to the remote system, wherein the particular data comprise the device's transmit queue capacity data, the upstream channel bandwidth data transmitted from the remote system, or both; wherein determining whether the transmit queue capacity data indicates that the transmit queue is full comprises:

monitoring a first number of receipt failure indicators transmitted from the CMTS;

comparing the first number of receipt failure indicators to a second number;

and

indicating the transmit queue is full if the first number is larger than the second number; and

improving by the device, if the upstream channel data transfer rate can be improved, the upstream channel data transfer rate based, at least in part, on the particular data.

2. (Previously Presented) The method of claim 1, wherein the device that shares the one or more upstream channels with other devices comprises a cable modem.

3-4. (Canceled)

5. (Currently Amended) The method of claim [[3]]1, wherein determining whether the upstream channel data transfer rate can be improved comprises determining whether the transmit queue capacity data indicates that the transmit queue is full.

6. (Original) The method of claim 5, wherein improving by the cable modem the upstream channel data transfer rate based, at least in part, on the particular data comprises:  
if the transmit queue capacity data indicates that the transmit queue is full:  
determining whether a capacity of the transmit queue is at a maximum capacity; and  
increasing the capacity of the transmit queue, if the capacity is not at the maximum capacity.

7. (Original) The method of claim 5, wherein improving by the cable modem the upstream channel data transfer rate based, at least in part, on the particular data comprises:  
if the transmit queue capacity data indicates that the transmit queue is full:  
determining whether a capacity of the transmit queue is at a maximum capacity; and  
initiating a service flow, if the capacity of the transmit queue is at the maximum capacity.

8. (Canceled).

9. (Currently Amended) The method of claim [[3]]1, wherein the bandwidth data comprises an upstream channel descriptor (UCD) message and an upstream bandwidth allocation map (MAP) message.

10. (Previously Presented) The method of claim 9, wherein determining whether the upstream channel data transfer rate can be improved comprises:

performing by the cable modem, operations of  
receiving the UCD message from the CMTS for each upstream channel, including the  
first upstream channel the cable modem is using;  
receiving the MAP message from the CMTS for each upstream channel;  
calculating an available bandwidth of each upstream channel based, at least in part, on  
the UCD message and the MAP message; and  
determining whether a different upstream channel has more bandwidth than the first  
upstream channel.

11. (Previously Presented) The method of claim 10, wherein improving by the cable modem the upstream channel data transfer rate based, at least in part, on the particular data comprises switching to the different upstream channel, if the different upstream channel has more available bandwidth than the first upstream channel.

12. (Currently Amended) An article of manufacture comprising:  
a machine-accessible medium including thereon sequences of instructions that, when  
executed, cause a device that shares one or more upstream channels with other devices to:  
calculate an available bandwidth of a first upstream channel based at least on upstream  
channel bandwidth data transmitted from a remote system;  
determine whether based, at least in part on particular data, an upstream channel data  
transfer rate can be improved over a current data transfer rate of the first

upstream channel from the device to the remote system, wherein the particular data comprise the device's transmit queue capacity data, the upstream channel bandwidth data transmitted from the remote system, or both; wherein determining whether the transmit queue capacity data indicates that the transmit queue is full comprises:  
monitoring a first number of receipt failure indicators transmitted from the remote system;  
comparing the first number of receipt failure indicators to a second number;  
and  
indicating the transmit queue is full if the first number is larger than the second number; and  
improve, if the upstream channel data transfer rate can be improved, the upstream channel data transfer rate based, at least in part, on the particular data.

13. (Previously Presented) The article of manufacture of claim 12, wherein the device that shares the one or more upstream channels with other devices comprises a cable modem.

14. (Original) The article of manufacture of claim 13, wherein the remote system comprises a cable modem termination system (CMTS).

15. (Canceled)

16. (Previously presented) The article of manufacture of claim 14, wherein the sequences of instructions that, when executed, cause the device to determine whether the upstream channel data transfer rate can be improved comprise sequences of instructions that, when executed, cause the device to determine whether the transmit queue capacity data indicates that the transmit queue is full.

17. (Original) The article of manufacture of claim 16, wherein the sequences of instructions that, when executed, cause the device to improve by the device the upstream channel data transfer rate based, at least in part, on the particular data comprise sequences of instructions that, when executed, cause the device to:

if the transmit queue capacity data indicates that the transmit queue is full:  
determine whether a capacity of the transmit queue is at a maximum capacity; and  
increase the capacity of the transmit queue, if the capacity is not at the maximum capacity.

18. (Original) The article of manufacture of claim 16, wherein the sequences of instructions that, when executed, cause the device to improve by the device the upstream channel data transfer rate based, at least in part, on the particular data comprise sequences of instructions that, when executed, cause the device to:

if the transmit queue capacity data indicates that the transmit queue is full:  
determine whether a capacity of the transmit queue is at a maximum capacity; and  
initiate a service flow, if the capacity of the transmit queue is at the maximum capacity.

19. (Canceled)

20. (Previously presented) The article of manufacture of claim 14, wherein the bandwidth data comprises an upstream channel descriptor (UCD) message and an upstream bandwidth allocation map (MAP) message.

21. (Previously Presented) The article of manufacture of claim 16, wherein the sequences of instructions that, when executed, cause the device to determine whether the upstream

channel data transfer rate can be improved comprise sequences of instructions that, when executed, cause the device to:

receive the UCD message from the CMTS for each upstream channel, including the

first upstream channel the cable modem is using;

receive the MAP message from the CMTS for each upstream channel;

calculate an available bandwidth of each upstream channel based, at least in part, on the UCD message and the MAP message; and

determine whether a different channel has more bandwidth than the first upstream channel.

22. (Previously Presented) The article of manufacture of claim 21, wherein the sequences of instructions that, when executed, cause the device to improve the upstream channel data transfer rate based, at least in part, on the particular data comprise sequences of instructions that, when executed, cause the device to switch to the different upstream channel, if the different upstream channel has more available bandwidth than the first upstream channel.

23. (Currently Amended) An apparatus, comprising:

an improvement determination unit (IDU),

to calculate an available bandwidth of a first upstream channel based at least on upstream channel bandwidth data transmitted from a remote system;  
and

to determine, based at least in part on particular data, whether an upstream channel data transfer rate can be improved over a current data transfer rate of the first upstream channel to the remote system, wherein the particular data comprise the apparatus's transmit queue capacity data, the upstream channel bandwidth data transmitted from the remote

system, or both; wherein determining whether the transmit queue capacity data indicates that the transmit queue is full comprises:  
monitoring a first number of receipt failure indicators transmitted from  
the remote system;  
comparing the first number of receipt failure indicators to a second  
number; and  
indicating the transmit queue is full if the first number is larger than the  
second number; and

an improvement unit, coupled with the IDU, to improve, if the upstream channel data transfer rate can be improved, the upstream channel data transfer rate based, at least in part, on the particular data.

24. (Previously Presented) The apparatus of claim 23, wherein the apparatus comprises a cable modem.

25. (Previously Presented) The apparatus of claim 24, wherein the remote system comprises a cable modem termination system (CMTS).

26. (Currently Amended) A system, comprising:  
a cable modem termination system, to transmit and receive data packets;  
customer premise equipment (CPE), to receive the data packets from cable modem termination system (CMTS) and transmit the data packets to the CMTS;  
a cable modem, coupled with the CMTS and the CPE, to determine whether, based at least in part on particular data, an upstream channel data transfer rate can be improved over a current data transfer rate of the first upstream channel from the cable modem to the CMTS, wherein the particular data comprise the device's transmit queue capacity data, the upstream channel

bandwidth data transmitted from the ~~remote system~~CMTS, or both; wherein determining whether the transmit queue capacity data indicates that the transmit queue is full comprises:  
monitoring a first number of receipt failure indicators transmitted from the remote system;  
comparing the first number of receipt failure indicators to a second number;  
and  
indicating the transmit queue is full if the first number is larger than the second number; and  
improve, if the upstream channel data rate can be improved, the upstream channel data transfer rate based, at least in part, on the particular data;  
and  
a coaxial cable, to couple the cable modem with the CMTS and transmit the data packets between the cable modem and the CMTS.

27. (Original) The system of claim 26, wherein the cable modem is integrated with the CPE.

28-30. (Canceled)

31. (Previously Presented) The method of claim 9, further comprising performing by the cable modem operations of  
receiving the UCD message and the MAP message from the CMTS; and  
calculating an available bandwidth associated with each at least upstream channels respectively.

32. (Previously Presented) The method of claim 9, further comprising performing by the cable modem operations of

calculating empty time-slots of each upstream channel of the one or more upstream channels; and

calculating an available bandwidth of each upstream channel based at least in part on the numbers of empty time-slots.